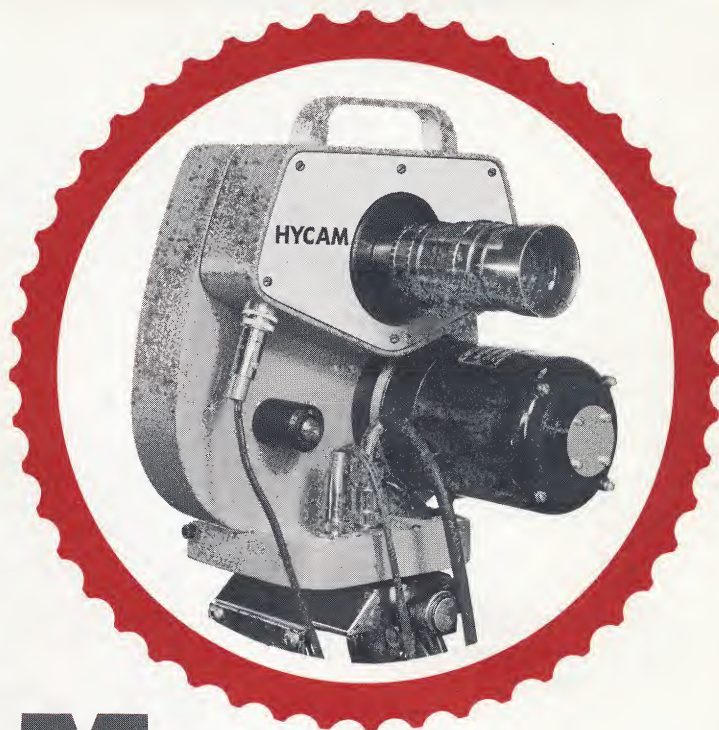


HYCAM



16-mm high-speed motion-picture camera

Pictures of previously unimagined quality and steadiness are produced in the Hycam Model K1001 at framing rates ranging from 10 to 8,500 pps.

Every feature, every accessory, every auxiliary developed and made useful in the field of high-speed cinematography is available to the Hycam owner at a price substantially less than elsewhere. And no other camera includes the full total of these features.

Basically, Hycam excellence and versatility stem from a totally new design. Hycam engineers, working from career-long experience in the photo-instrumentation field, went back to fundamentals and produced in the Hycam series a design of such straightforward simplicity as to solve a series of basic technical problems and reduce costs of production drastically, both at once.

The heart of the Hycam is a single shaft carrying the film-transport sprocket, the rotating-prism optical-compensating device, and the segmented shutter. Eliminating all gearing with its troublesome backlash and limiting the number of critical bearings to two, this advanced design concept not only produced the industry's steadiest picture and the industry's least expensive camera, but also opened the way for a myriad of simple approaches to other special features and capabilities.

These include:

- *Interchangeable prisms for 1/2-frame 16-mm or true 8-mm (with 20 to 17,000 pictures per second)*
- *Flat film gate for uniform resolution*
- *Interchangeable shutters permitting exposures as short as 1.17 microsec with full 16-mm frame height*
- *Usability of any c-mount lenses*
- *Availability of aperture-mask fiducial markers for putting crosshairs on film*
- *One timing light standard, second auxiliary timing light can be added*
- *Event-synchronizer and end-of-film cutoff switches standard*
- *Convertibility of basic mechanism between 100-foot, 400-foot, and 2000-foot cameras*
- *General mechanical simplicity, which permits maintenance or parts changing with simple standard tools*
- *Availability of auxiliary units for cine-oscillography, streak photography, and electronic flash synchronization*

HYCAM FEATURES

INTERCHANGEABLE SHUTTERS

Standard gives exposure ratio of 1/2.5 (at 1,000 pps, shutter speed is 1/2500 sec.). Other sizes available down to 1/100 for a 1.17 microsec exposure at 8,500 pps without reduction in frame height.

TIMING LIGHT

Circuitry and external connections. Single light puts marks on one edge of film. Auxiliary kit adds second timing light for opposite side of film.

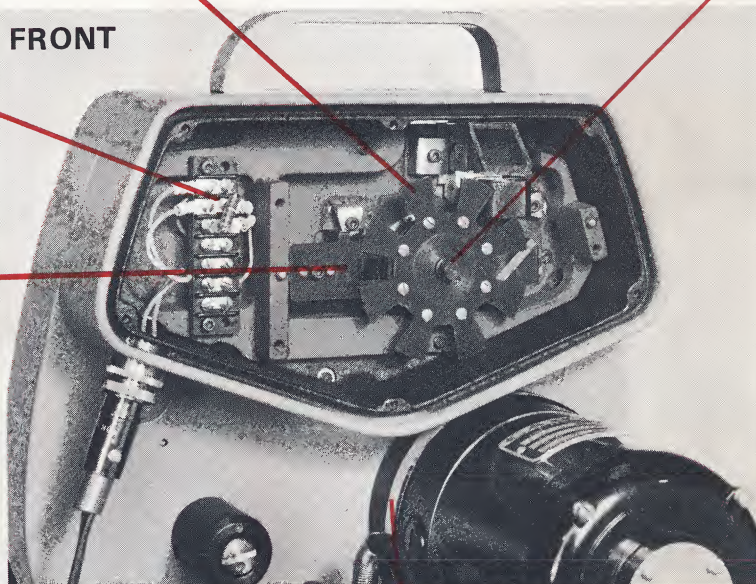
CROSSHAIRS

Can be added right here on the aperture mask.

C-MOUNT LENSES

Use of inexpensive and readily available c-mount lenses of any focal length adds to Hycam versatility.

FRONT



INTERCHANGEABILITY

100-foot unit shown here. Optical head is quickly interchanged between 100-, 400-, and 2,000-ft film transports. (See illustration at top of opposite page.)

SINGLE UNIVERSAL MOTOR

Handles entire speed range from 10 to 8,500 pps, depending on voltage input. For low frame rates, d-c is used. At higher rates, either a-c or d-c can be used.

FULLY GUARANTEED

90-day guarantee: If, for any reason, you are not completely satisfied with any Red Lake product within 90 days, you may return it for full credit. One-year guarantee covers any defect in workmanship or material.

Red Lake Labs, Inc.

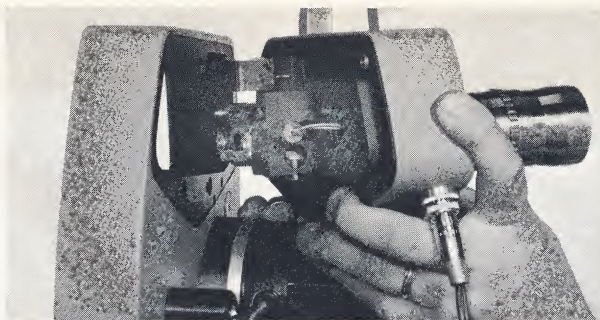
PHOTO INSTRUMENTATION EQUIPMENT

Products the User Likes

SIN
Carr
tatin
mecl

GLE SHAFT

es segmented shutter, film sprocket, and ro-
g prism. This is the heart of the Hycam
anism.



Release of three screws permits rapid removal of optical head from film transport



REAR

FLAT FILM GATE

Pictures look like intermittent frames.

SMOOTH-START CLUTCH

Centrifugal clutch brings film to speed without expensive voltage-control devices.

FILM COMPARTMENT

Minimizes film chips at end of run.

SPEED CURVES. See chart, page 4

VIEWING AND FOCUSING

Done by a direct through-the-lens viewer and focuser directly on the film. Darkslide and external shutter positioner provided.

EVENT SYNCHRONIZER

Triggers the event at pre-set point in film. Second switch interrupts motor power at end of film.

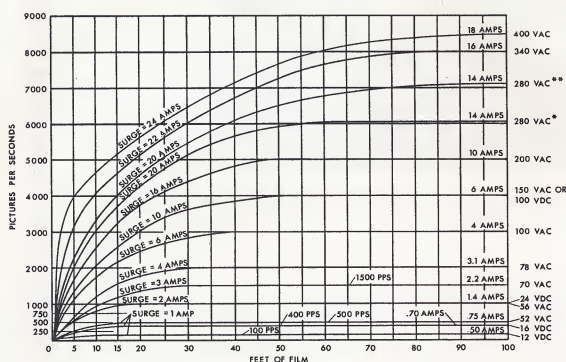
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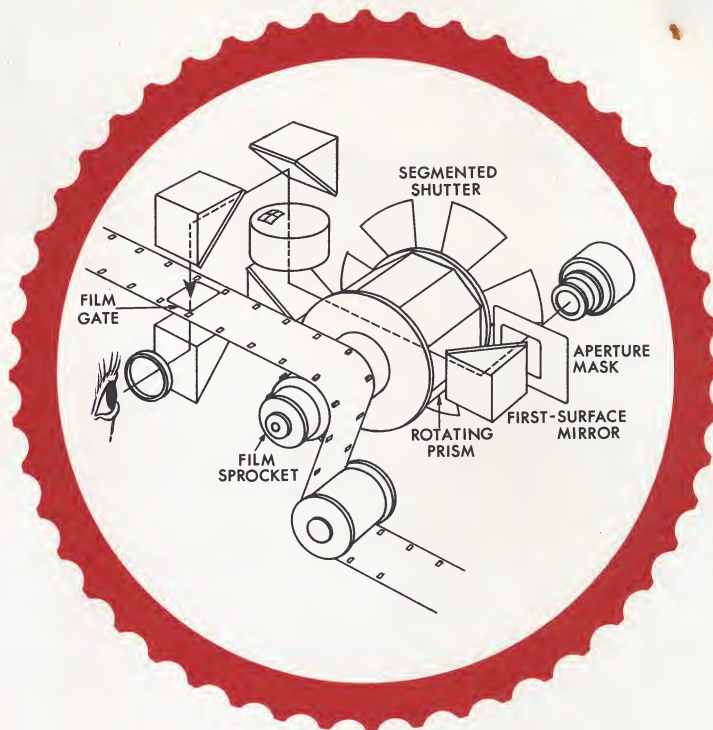
739-1698 (408)

SPEED CURVES



HYCAM

specifications



OPTICAL HEAD

(interchangeable with 100-, 400-, and 2,000-ft models)

Prism-Sprocket-Shutter Assembly:

(interchangeable in field)

- Prism, 8-sided (standard)
10 to 8,500 pps—16-mm full frame
- Prism, 16-sided (accessory)
20 to 17,000 pps—1/2-frame
16-mm or true 8-mm
- Sprocket, 8-frame type, is used with both prisms
- Shutter, 1/2.5 (standard)
1/5, 1/10, 1/20, 1/50, 1/100 (accessories)

Viewing and Focusing:

Direct through-the-lens viewer and focuser

Lenses:

C-mount lenses of any focal length available (accessories)

Fiducial Marker:

Crosshairs on accessory aperture mask

Timing Lights:

One NE2J lamp for marking one side of film (standard) — second light to be added on opposite side of film (accessory)

Film Gates:

Flat, spring-loaded to accommodate various film thicknesses. Easily removable

FILM TRANSPORT

Film Capacity:

Model K1001	16-mm by 100 ft
Model K1004	16-mm by 400 ft
Model K10020	16-mm by 2,000 ft

Drive System:

Single universal motor (fused) and smooth-start centrifugal clutch handle speed range 100 to 8,500 pps. Accessory gear train covers range 10 to 300 pps

Spool Ejectors:

Fingertip controls ease the removal of film spools

Event Synchronizer:

Electrical co-ordination between starting of camera and starting of event

Cutoff Switch:

Terminates motor power at end of film, automatically

Film-Supply Spindle:

Adjustable tension

Tripod Mounting:

- 1 hole—1/4-20 thread (steel insert)
- 3 holes—3/8-16 thread

Specifications subject to change without notice.

ACCESSORIES

Oscillo Attachment

Adapter for putting Pentax-type lens in camera door for super-impositioning of oscilloscope trace over framing image.



Streak Attachment

Auxiliary lower gate gives slit at film plane — adjustable 0 to 3/16 in. Writing rates up to 0.06 mm per μ sec. Uses oscillo attachment and lens system.

Electronic Flash

Magnetic pickup provides circuitry for synchronizing electronic flash with full-open shutter.

Slow-Speed Transmission

Gear train for speed reduction to 10 pps.



Tripod

Sturdy unit produced for Red Lake by Quick-Set. Has worm-gear elevator, geared spring loaded 90-degree tilt head, and positive locks in all positions. 13 lb.

Timing-Light Generator

Solid-state source unit for timing pulses to neon lamp in Hycam. Provides 10, 100, or 1,000 pulses per second. Inexpensive, battery or 115-v powered, 4 lb.



Exposure Meter

Ideal unit for high-speed photography is the Honeywell Spot Meter. Has an angle of acceptance of only three degrees. Reads directly in camera settings.



Lens Auxiliaries

Extension tubes designed in various lengths for c-mount lenses. Also lens adapters for using special-mount lenses on Hycam.

SPEED-CONTROL EQUIPMENT

D-C Power Supply

Full-wave 6-amp solid-state rectifier unit with 115-v 50/60 cps input, 0 to 110-v d-c output. Varies framing rate of standard Hycam over range 100 to 4,000 pps; with Slow-Speed Transmission, 10 to 300 pps.



Variable Autotransformer

Operating from 115-v 50/60-cps power gives 0 to 280-v a-c output to control standard Hycam from 500 to 6,000 pps; with Slow-Speed Transmission, 50 to 500. For higher frame rates, larger capacity autotransformers are required.

TOTAL WEIGHTS

Model K1001 (100-ft capacity)	13 lb
Model K1004 (400-ft capacity)	28 lb
Model K10020 (2,000-ft capacity)	52 lb

RED LAKE LABS., INC.
2971 Corvin Drive
SANTA CLARA, CALIFORNIA (95051)
(Area Code 408) 739-1698

NEW OPTICAL QUALITY

HYCAM 16MM HIGH SPEED MOTION PICTURE CAMERAS

ROTATING PRISM TYPE

The basic difference between the HYCAM design and all other rotating prism camera designs is that all gears have been removed from the optical system and the rotating prism and film sprocket have been placed on one shaft.

A further improvement has been made by adding a segmented disc shutter to this shaft. This technique eliminates gear backlash and bearing run out which improves the steadiness and the optical quality of the film. An 8 sided rotating prism is used in the full frame 16mm and a 16 sided rotating prism is used in the 1/2 frame 16mm or 8mm cameras. These greater number of sides minimize the angular rotation of the prism during a given exposure. This greatly enhances the picture quality because of its superior optical compensation over the standard 4 sided prism camera such as all other manufacturers use.

The current HYCAM cameras basically consist of two models, a 100' model and a 400' model.

HYCAM is so designed that the main optical parts are contained in a removable optical head which can be interchanged from model to model and from unit to unit. A speed sensor is installed in all 400' optical heads. If a 100' optical head is to be used with the 400' model, the speed sensor must be installed in it at the factory. The speed sensor does not interfere in any way with its operation when used with the 100' model. It costs \$60.00 to have the speed sensor installed in the 100' optical head.

Both standard models have a minimum frame rate of 100 frames per second.

Both models can be reduced to ten frames per second by having a speed reducer added at the factory as an accessory. The speed reducer does not in any way interfere with the operation of the camera at the higher frame rates. The speed reducer can be changed from high to low range by merely shifting a lever.

Both models can be easily changed from a full frame 16mm to 1/2 frame 16mm or a true 8mm. Two methods can be used to change from the full frame 16mm to the 1/2 frame 16mm or 8mm:

1. Change the complete optical head. This requires about two minutes time and the 1/2 frame optical head costs \$955.00.
2. You can change the prism/shutter/sprocket shaft in the field. This requires thirty minutes time and the 16 sided prism/shutter/sprocket shaft assembly costs \$450.00. No special mechanical skills are necessary for this operation.

SPECIAL FEATURES

All models include the smooth start centrifugal clutch.

All models contain a built-in power cut-off switch.

All models include a built-in event synchronizer.

All models include a flat spring loaded film gate.

All models have interchangeable shutters making it possible to change the shutter speed without changing the frame rate. This can be done quickly in the field. The minimum shutter speed with the full frame 16mm or the 1/2 frame 16mm is one microsecond, as a .5 microsecond with the true 8mm.

The 1/2.5 shutter is supplied as standard with all model cameras. Shutters available for the full frame 16mm models are: 1/2.5, 1/5, 1/10, 1/20, 1/50, 1/100. Other sizes are available on special order down through the 1/100. All of the above sizes are available for the 1/2 16mm, excepting the 1/100. All of the above shutters are available for the 8mm, including the 1/100.

There is no reduction in frame height with the higher ratio shutters.

To determine the shutter speed at a given frame rate with a given ratio shutter, use this shutter speed formula: $SS = 1/\text{ratio} \times \text{FPS}$.

EXAMPLE

$$\frac{1}{2.5 \times 1000} = \frac{1}{2500} \text{ sec.}$$

(This is true for all models.)

NEW IMPROVED OPTICAL SYSTEM

The model K1 has been discontinued. The model K2 HYCAM will be available January 15, 1965. The major changes are as follows:

1. Right angle prisms have been substituted for all front surface mirrors.
2. The one field lens has been substituted for two field lenses.
3. The relay lens has been completely redesigned to transmit more light, give a higher resolution and a flatter field on the film.

The new internal optics are so superior to the old optics that superior objective lenses show an improved quality on the film over routine objective lenses.

C MOUNT LENSES ARE STILL USED

The maximum effective aperture is f/2.8. The transmission loss through the system is 1/2 stop. This requires a 1/2 stop wider lens setting than normal. All HYCAM models in the field can be modernized with the new optics for approximately \$200. The price on all K2 models has been increased by \$120 over the old K1 models, because of the higher cost of the new optics.

The optical resolution with a good objective lens with a plus X type film is as follows:

Center 68 lines/mm vertical and horizontal

Edges 56 lines/mm vertical and horizontal

We believe this resolution to be the highest of any of the rotating prism cameras on the market today. The frame rate has no effect on resolution. These numbers should be obtained at all speeds commensurate with good photographic practices.

POWER SUPPLIES NEEDED

DC is needed for all standard 100' models for frame rate below 1000 fps. DC can be used throughout the entire speed range. However, above 1000fps it is customary to use AC. We have available a 4 lb. DC rectifier that operates the 100' model from its minimum frame rate to 5000fps for the full frame 16, (10,000fps for the 1/2 frame 16 or 8mm). (Price, \$112.50) For the top frame rates on the 100' models, RL236-1M is recommended.

AC is used throughout the entire speed range for the 400' models. An electric speed control, built into the camera base, is used from the minimum frame rate to 5000 (or 10,000fps with the 1/2 frame 16 or 8mm). Speed setting dials are used. The film accelerates to the desired speed in a minimum length of time and the electronic control regulates the frame rate within one percent. Above the 5000fps (or 10,000fps), the electronic speed control is neutralized by a switch provided and our model RL236-1M is recommended. 195V AC results in 10,000fps (or 20,000fps for the 1/2 frame or 8mm version). (See speed curves.)

CURRENT MODELS AVAILABLE

<u>MODEL NO.</u>	<u>FRAME RATES</u>	<u>CAPACITY</u>	<u>PRICE</u>
K2001	100 to 8500fps	16mm x 100'	\$1295.00
K20S1	10 to 8500fps	16mm x 100'	\$1445.00
K2001A	200 to 17,000fps	1/2 frame 16mm or 8mm x 100'	\$1445.00
K20S1A	10 to 17,000fps	1/2 frame 16mm or 8mm x 100'	\$1595.00
K2004E	100 to 10,000fps	16mm x 400'	\$2330.00
K20S4E	10 to 10,000fps	16mm x 400'	\$2580.00
K2004AE	200 to 20,000fps	1/2 frame 16mm or 8mm x 400'	\$2480.00
K20S4AE	20 to 20,000fps	1/2 frame 16mm or 8mm x 400'	\$2730.00

SEE PRICE LISTS FOR ALL DETAIL PRICES

EXPLANATION OF MODEL NUMBERS

K2 denotes new optical quality.

1 denotes 100' capacity.

4 denotes 400' capacity.

S denotes speed reducer

E denotes electronic speed control
unit installed in base of camera.

A denotes 1/2 frame 16mm or 8mm.

ALL MODEL NUMBERS INDICATED ABOVE INCLUDE SPECIFICATIONS LISTED IN PRICE LIST
DATED JANUARY 1, 1965.

* * * * *

FULLY GUARANTEED

90-DAY GUARANTEE: If, for any reason,
you are not completely satisfied with
any Red Lake product within 90 days,
you may return it for full credit.

ONE-YEAR GUARANTEE: Covers any defect
in workmanship or material.

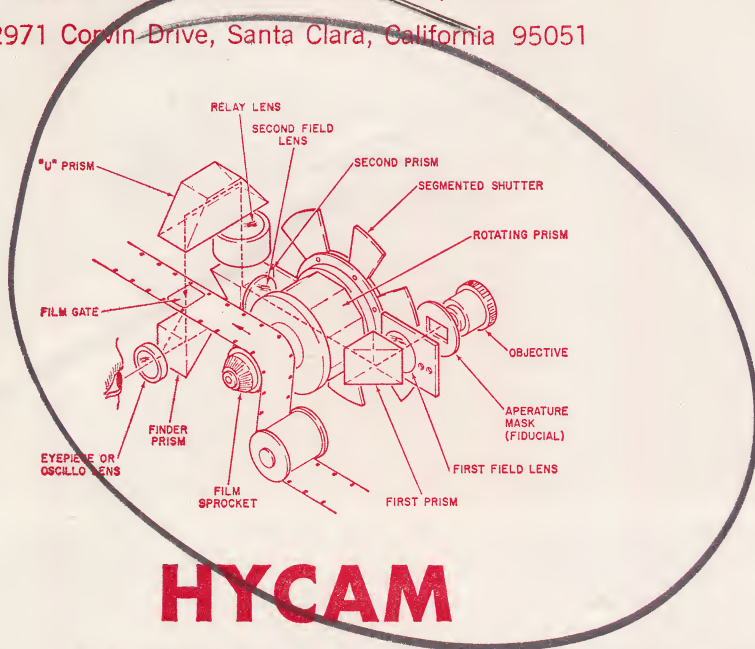
HYCAM

FAST MOVIE CAMERA & ACCESSORIES

Red Lake Laboratories, Inc.

PHOTO INSTRUMENTATION EQUIPMENT

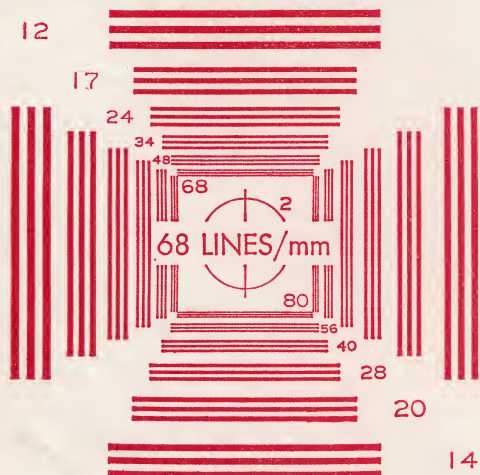
2971 Corwin Drive, Santa Clara, California 95051



HYCAM

The world's most advanced
rotating prism cameras

Mr. T. Ne¹
SYSTEMS C
P.O. Box
Schooley



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